TITLE:

System and Method for Providing Electronic Bulk Buying

Related Applications

The present application is related to co-pending application entitled "System and Method for Providing a Push Gateway Between Consumer Devices and Remote Content Provider Centers", assigned to the same assignee as the present application, which is incorporated herein by reference. Furthermore, the present application is related to co-pending application entitled "System and Method for a Push-Pull Gateway-Directed Digital Receiver", assigned to the same assignee as the present application, which is incorporated herein by reference.

Field of Invention

The present invention relates generally to the field of broadcast communications. More specifically, the present invention is related to purchasing data content from a digital broadcast.

Background of the Invention

Definitions have been provided to help with a general understanding of network communications and are not meant to limit their interpretation or use thereof. Thus, one skilled in the art may substitute other known definitions or equivalents without departing from the scope of the present invention.

Datagram: A portion of a message transmitted over a packet-switching network. One key feature of a packet is that it contains the destination address in addition to the data. In IP networks, packets are often called datagrams.

Push: In client/server applications, to send data to a client with or without the client requesting it. The World Wide Web (WWW) is based on a Pull technology where the client browser must request a Web page before it is sent. Broadcast media, on the other hand, utilize Push technologies because information is sent out regardless of whether anyone is tuned in.

Increasingly, companies are using the Internet to deliver information Push-style. One example of a widely used Push technology is e-mail. This is a Push technology because you receive mail whether you ask for it or not -- that is, the sender pushes the message to the receiver.

Pull: To request data from another program or computer. The opposite of Pull is Push, where data is sent with request being made. The terms Push and Pull are used frequently to describe data sent over the Internet. As mentioned earlier, the WWW is based on Pull technologies, where a page isn't delivered until a browser requests it. Increasingly, however, information services are harnessing the Internet to broadcast information using Push technologies. A prime example is the PointCast Network™.

WAP: The Wireless Application Protocol (WAP) is a secure specification that allows users to access information instantly via handheld wireless devices such as mobile phones, pagers, two-way radios, smart phones and communicators.

WAP supports most wireless networks. These include cellular digital packet data (CDPD), Code-Division Multiple Access (CDMA), Global System for Mobile Communications

(GSM), PDC, PHS, Time Division Multiple Access (TDMA), FLEX (K56Flex), ReFLEX, iDEN, TETRA, DECT, DataTAC, and Mobitex. Additionally, WAP is supported by all operating systems. Ones specifically engineered for handheld devices include PalmOS®, EPOC®, Windows CE®, FLEXOS®, OS/9®, and JavaOS®.

Furthermore, WAPs that use displays and access the Internet run what are called microbrowsers--browsers with small file sizes that can accommodate the low memory constraints of handheld devices and the low-bandwidth constraints of a wireless-handheld network.

UDP: User Datagram Protocol (UDP) is a connectionless protocol that, like Transmission Control Protocol (TCP), runs on top of IP networks. Unlike TCP/IP, UDP/IP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network. It's used primarily for broadcasting messages over a network.

W-UDP: This is the transport layer that is responsible for moving WAP data from a sender to a recipient, and vice versa. WDP is similar to UDP and is the wireless equivalent of UDP.

Radio Broadcasting: Airborne transmission of audio signals via electromagnetic carrier waves accessible by a wide population by means of standard receivers, such as radios. Radio waves are not only deployed as a carrier in standard radio broadcasting, but also in wireless telegraphy, telephone transmission, television, navigation systems, and radar. Radio waves are of different length and usually identified by their frequency, i.e., the number of times per second that a periodic wave repeats. The shortest waves have the highest frequency, and the longest waves have the lowest frequency. A typical radio communication system features the following

two main components: a transmitter and a receiver. The transmitter generates electrical oscillations at a radio frequency called the carrier frequency. In analog radio broadcasting, either the amplitude (AM) or the frequency (FM) itself may be modulated to vary the carrier wave, thereby producing sounds. At the receiver device, the antenna converts the incoming electromagnetic waves into electrical oscillations, which are then increased in intensity by amplifiers. Finally, a speaker in the receiving device converts the electrical impulses into sound waves audible to the human ear. Several types of noise such as static – caused by electrical disturbances in the atmosphere, hum – a steady low-frequency note commonly produced by the frequency of the alternating-current power supply, hiss – a steady high frequency note, or a whistle – a pure high-frequency note produced by unintentional audio-frequency oscillation, cause broadcast interference and distortion at the receiver end.

Currently, approximately 10,000 radio stations are located throughout the U.S.A., reaching a vast audience. U.S. radio stations are operating with analog technology and are almost evenly divided between two broadcast spectrums: amplitude modulation (AM) at 0.525 – 1.705 MHz and frequency modulation (FM) at 88-108 MHz. A new emerging technology known as in-band on-channel (IBOC) allows these radio stations to deploy digital transmission technology within existing bandwidths allocated to the AM and FM stations. Digital transmission allows data processing in strings of 0's and 1's, rather than analog transmission by means of electronic signals of varying frequency or amplitude that are added to the carrier wave of a given frequency. Digital technology is primarily deployed in new communication media, such as computers and fiber-optic networks. By way of example, a modem is used to modulate

user. In contrast, "Push" technology, which also operates within the client-server model, does not require a user initiated data request prior to the transmission of data. Such data transmissions are common in the so-called Web Casting technology, i.e., the prearranged updating of news, weather, or other selected information on the interface of a device with digital capabilities through periodic and generally unobtrusive transmission. Currently, Web Casting technology primarily targets computer users. Yet, as described above, there is a huge audience in the radio broadcast area, and there exists a strong demand for data casting content such as: song titles, artist names, lyrics, traffic and weather news, stock market quotes, pager messages or complementary product information. New radio receivers with Liquid Crystal Displays (LCD) combined with the deployment of the inbound on-channel (IBOC) technology facilitate such data casting.

All data transmitted over the Internet is broken down into small units of data called packets. Each packet is assigned a unique number, which is later used to re-assemble the data packets when they arrive at their destination. For this reason, the Internet is also called a packet-switched network. The series of protocols used to achieve packet-switching is Transmission Control Protocol/Internet Protocol (TCP/IP). In order to standardize the communication between servers and clients on the Internet, additional protocols that are usually packaged with TCP/IP are used for the transmission of data.

As known in the art, network communication is based on the seven layer model Open System Interconnection (OSI). Information being transferred from a software application in one communication system to another, e.g., from one computer to another via the Internet, must pass

through each of the OSI layers. Each layer has a different task in the information exchange process and the actual information exchange occurs between peer OSI layers. Each layer in the source system adds control information to the transmission data and each layer in the destination system analyzes and removes the control information from that data. At the lowest layer, the physical layer, the entire information packet is placed onto the network medium where it is picked up by the receiving unit. In this model, protocols represent and describe the formal rules and conventions that govern the exchange of information over a network medium. The protocol likewise implements the functions of one or more of the OSI layers. For example, the transport protocol for Web sites is the Hyper Text Transfer Protocol (HTTP), for e-mails Simple Mail Transfer Protocol (SMTP), and for software programs File Transfer Protocol (FTP). Premised in the functions of the used network layers to be implemented and the tasks to be achieved during the communication, protocols vary in their specifications. Many additional protocols exist to assist in standardizing communication standards.

Web sites are formatted in Hyper Text Markup Language (HTML), Wireless Markup Language (WML), or Extensible Markup Language (XML). These are standard text formatting languages for interconnected networks such as the Internet. So-called Web browsing software interprets HTML, WML, and/or XML documents, thereby allowing users to view Web sites on their display screen. As in the case with protocols, additional languages exist for the marking-up of Web sites or other data.

The data link between the Internet and a wireless device is established via a wireless modem or an antenna and a wireless carrier service using radio frequencies, rather than via

twisted-pair or fiber-optic cables. Content for wireless services is marked up in Wireless Application Protocol (WAP), rather than HTTP. For that reason, Internet servers cannot directly communicate with, and content cannot be directly sent to wireless devices.

Wireless devices equipped with a communication interface such as a modem are able to download various forms of data content. One of the problems facing wireless broadcasters is the inability to stream multimedia data, especially multimedia audio data content, to wireless devices in real time, due to the limited bandwidth considerations at the transmitter's side and limited data rate reception at the receiver's side.

With the advent of many compression techniques such as motion picture encoding group (MPEG) format, digital audio formats such as MP3's are becoming increasingly popular. Some prior art systems have attempted to stream such compressed content over networks such as the Internet, and some prior art systems have gone even further and implemented e-commerce models for purchasing such digital content. None of these business models, however, provide for an appropriate mechanism for purchasing such digital content, while keeping in mind the limited bandwidth considerations. Furthermore, these prior art systems fail to provide for a user, broadcaster, or content provider definable threshold (which is time or content dependent) for downloading such content. Additionally, the prior art systems fail to disclose purchasing data content (to be downloaded) by a Push-Pull gateway over an in-band on-channel (IBOC) network.

SUMMARY OF THE INVENTION

The present invention provides for a method and system for point-of-sale (POS) and purchase of data content. In the preferred embodiment, one or more broadcast servers transmit information to one or more receivers over a network such as an in-band on-channel (IBOC) network. Additionally, the receiver is a digital audio broadcast (e.g., iBiquity's iDAB™) receiver and the broadcast information comprises advertisement content and multimedia audio content. Furthermore, in the preferred embodiment, a client with an iDAB receiver is able to purchase multimedia content by a simple action through a man-machine interface (MMI). The present invention also provides for a mechanism for setting thresholds that define the amount of multimedia content to be purchased (by the client) before actual broadcast of the content is to begin. The thresholding mechanism is implemented either in the iDAB receiver or in a Push-Pull gateway broadcasting the multimedia content.

In the preferred embodiment, the broadcast content comprises advertisements and multimedia data content. Users at the receivers end are able to interact with the man-machine interface and purchase multimedia content. Additionally, users are able to respond to advertisements rendered in the man-machine interface and purchase merchandise. For example, by clicking on an advertisement, users are able to buy multimedia audio content, wherein the content is either sent to the user's physical address as a compilation CD or the content is uploaded to the receiver. Also, the present invention provides for a method and system for bulk-downloading multimedia content using thresholding and via protocols such as, but not limited to,

the point-to-point protocol (PPP), transmission control protocol/internet protocol (TCP/IP), and wireless datagram protocol (WDP).

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a Push-Pull Gateway (hereafter iPPG or iGateway) End-to-End (E2E) system used to implement the present invention.

Figure 2 illustrates a table outlining a brief description of the various elements that make up the system in Figure 1, and the interfaces associated with these elements.

Figure 3 illustrates, in greater detail, the functionality of iPPG used to implement the present invention.

Figure 4 illustrates how incoming data is handled at the client (receiver's end - an IBOC-enabled mobile device).

Figure 5 illustrates in greater detail the interaction between the turbo broadcast layers and the digital receiver.

Figure 6 illustrates a more specific instance wherein the application software layer of Figure 5 is a vendor interface.

Figure 7 illustrates the present invention's method associated with a passive mode point-of-sale (POS) and bulk purchase of data content.

Figure 8 illustrates a specific embodiment of the present invention's bulk purchase procedure, wherein a direct order is placed from a receiver to a direct order service (DOP) without an intermediate entity.

Figure 9 illustrates the relation between a GPS time stamp and broadcast data content.

Figure 10 illustrates the present invention's active mode real-time indirect order placement using transmission control protocol/Internet protocol (TCP/IP).

Figure 11 illustrates the active mode real-time indirect order placement embodiment of the present invention, wherein communication between a receiver and the B-server is accomplished by using a B-Server over IDAB as the downlink and a receiver over the traditional uplink.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

While this invention is illustrated and described in a preferred embodiment, the invention may be produced in many different configurations, forms and materials. There is depicted in the drawings, and will herein be described in detail, a preferred embodiment of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and the associated functional specifications for its construction and is not intended to limit the invention to the embodiment illustrated. Those skilled in the art will envision many other possible variations within the scope of the present invention.

Figure 1 illustrates a Push-Pull Gateway (hereafter iPPG or iGateway) End-to-End (E2E) system **100** used to implement the present invention. This Push-Pull Gateway system is described in greater detail in co-pending application entitled "System and Method Providing a Push Gateway Between Consumer Devices and Remote Content Provider Centers". The system components (to be described below) of the iPPG collectively achieve the Push, Pull, and send

features of the gateway (iPPG). In Figure 1, the remote application service providers (ASPs) **102** submit (or Push) content, over a network **N** (e.g., the Internet) via a protocol such as HTTP, to the iGateway **104**. Optionally, a local ASP **115** can also be accessed via a local ASP interface L. The iGateway **104** is able to either accept or reject such requests by ASPs **102** and **115**. The iGateway is also able to retrieve (or Pull) data server's **105** content as selected by a station operator over a network such as the Internet. The iPPG, with the help of an operation administration module (OAM) **110**, prioritizes, schedules, and sends datagrams to the exciter **106** over interface **E**. Receiver **108** (a client such as iBiquity's proprietary iBOC receiver/client) acquires the data and turbo broadcast layer **113** de-encapsulates the data. The data is then displayed on terminal **114**. Furthermore, a billing procedure keeps track of all data pushes (via pre-defined logistics **112**) from various ASPs for billing purposes. As will be detailed later, when in listen mode, the data receiver **108** displays the received data continuously, or, upon demand, as per filtration activated by subscriber. A brief description of the various elements that make up the system in Figure 1 and the interfaces associated with these elements are described in further detail in Table 1 as shown in Figure 2.

Figure 3 illustrates, in greater detail, the functionality of iPPG **300**. The content provider center **302** establishes session **304** with iPPG **300**. The established session provides for a data link (such as a link based upon a standard peer-2-peer protocol or any other data communication link). Furthermore, as shown, an operation administration and maintenance module (OAM) **308** controls, in an event driven manner, the iPPG **300**. Content provider center **302** is able to submit a Push request **306** to the iPPG **300**, where it is first received by the network inbound queue **310**.

Next, Push authenticator **312** identifies and authenticates content provider center **302** as the Push initiator. This authentication is performed based upon information stored in content provider center database **314**. Furthermore, the Push authenticator **312** checks if the Push message contains any client device capabilities queries (a query requesting client's requested format (e.g., Text, HTML, WML, etc.), and if so, the queries are passed onto OEM device profile database **316**, wherein the device profiles of queried devices are extracted and passed on to the network outbound queue **318** for transmission to the content provider center **302**. On the other hand, if the Push message is made up of just data content to be Pushed (or a request for data content to be Pushed), Push ID/originator ID numbers **320** are extracted from the content provider center database **314** and passed onto the Push recorder **322** for storage.

A scheduler **324**, then parses control entity of the message and passes such information to bandwidth module **321**. The bandwidth module **321** is used for bandwidth management purposes. Additionally, the bandwidth module determines time/schedule for contained instructions and determines if requested bandwidth is already assigned for the time of day. If so, the bandwidth module **321** passes the information to network outbound queue **318** with options of available bandwidth slots. If request is not conflicting, it passes such information for storage to Push recorder **322**. If instruction extracted by the scheduler **324** includes retrieving data, the content fetcher **326**, in conjunction with the scheduler **324** and a network database **328**, Pulls data from content providers **330** via a network **332**, such as the Internet. The Pulled data is then transformed and encoded (via data transformer **334** and encoder **336**, respectively) into a format requested by the client. Furthermore, data transformer **334** and encoder **336** split the data into

octet data blocks, assign serial numbers to all packets, and pass them on to addressing module **342** and cache **338**. Additionally, a bandwidth module **340** is used for bandwidth management purposes. Lastly, the data from the addressing module is passed onto the IBOC outbound queue **344** to various end devices linked to a broadcast network **346,** such as an IBOC network.

The iPPG maintains a log of broadcast detail records from the exciter to the iPPG (e.g., for the purposes of billing). The iPPG also supports 7 and 8 bit data coding schemes for OTA efficiency (local function in iPPG). In one variation, to improve OTA efficiency, a numeric identifier is used instead of a URI. In this case, a broadcast interim authority assigns numbers to well-known user agents to avoid the overhead of sending a URI. The broadcast interim authority publishes a list of assigned numerical identifiers. If an iPPG requests to Push content with an application address URI that the iPPG recognizes as a URI (which has broadcast interim authority assigned numeric identifier), the URI is replaced with the numeric identifier. In an extended variation, the Push initiator requests a numeric identifier to be used (an identifier that is not registered). It should, however, be noted that special care should be taken to avoid assigning the same identifier to ASPs. The iPPG is also involved in reliability, rate at which broadcast of message should be repeated, time at which a message should commence broadcasting, determining pre-download with deactivate flag enabled, and determining when to activate the deactivate flag.

Thus, the iPPG is able to transmit data content (to be broadcast) in advance with the receiver display deactivate flag enabled (data content is not activated). At prime time or at a

predetermined broadcast time, the display deactivate flag is enabled, thereby making the pre-downloaded broadcast content available for presentation to the receiver.

Furthermore, the iPPG initiates transmission by sending fixed-length short messages to the exciter, and when necessary, pads the message with appropriate characters to a length of fixed octets. It further maintains flow control when received load indication messages indicate an underflow or overflow situation by the exciter (for duplex E interface). Additionally, in one variation, the iPPG is able to route the content to selective iPPG (when more than one iPPG exists and are networked). In this scenario, a centralized gateway performs intelligent scheduling such that same information is not repeated by each station (sharing similar contour coverage), keeps track of available bandwidth, and instructs receivers to look around for other information. Additionally, iPPG determines the neighboring channel (look around) on which the message should be broadcast. The iPPG further routes broadcast messages to the appropriate exciter (in the instance that more than one exciter exists and these exciters are networked).

The iPPG also determines the time at which a message should cease being broadcast and subsequently instructs each exciter to cease broadcast of the message. It also determines the set of geographic and exciter zones to which a message should be broadcast, and indicates the geographical scope of each message (if networked).

Various fields are presented as options for defining various parameters of broadcasting, which advertisers need to select. Generally, these fields are provided in XML/HTML or by HTTP. It should be noted that a broadcast association allocates a service operator code (SOC). In this instance periodicity, refers to the number of times the content is to be transmitted. In the

event of a conflict where the iPPG has more than one message to send at the same time, the iPPG decides the order of such messages as a matter of implementation.

An FCC allocated identifier can be used as an operator-defined contour. Thus, the iPPG Pulls the deterministic information from the FCC database and uses this information for contour (latitude, longitude) verification purposes. The zone field identifier provided by ASP identifies which exciter the message applies to. Preferably, the zone-list contains at least one exciter and the iPPG keeps a log of OTA transmissions. The billing management layer or OAM layer uses this information for later use. This parameter is a list indicating the number of times the message has been sent to each exciter and if exciter has completed OTA transmission. It should be noted that the number-of-broadcasts-completed can be set to zero if there were no broadcast messages sent.

To create better-formatted content for a particular iBOC device, the ASP requests the capabilities of a particular device on the iBOC network. The iPPG maintains a OEM device profile database of registered OEMs and may share this information with the ASP. It should be noted that, although a OEM profile database is mentioned in conjunction with the iPPG, one skilled in the art can envision the ASP using other means (such as the Internet) to extract such profile information.

Thus, in summary, the iGateway or iPPG is able to Push data from various content provider centers and is also able to Pull data from remote content providers. The content provider centers and remote content providers are able to communicate with the iPPG via a network (LAN, WAN, Internet, etc.). Based upon the request from the content provider centers,

the data is then Pushed via a network such as an IBOC network onto various end devices (clients).

It should be noted that although only one iGateway (or iPPG) is described, one skilled in the art of networked communication can envision using multiple iGateways (or iPPGs), for distributed processing, wherein such gateways are controlled by one or more centralized gateways. Thus, one skilled in the art can envision using various combinations including, but not limited to, one iPPG and many transmitters, a set of networked iPPGs, and a master iPPG and a scaled down iPPG. Furthermore, although the iPPG, remote content providers, and content provider center are shown to be separate entities communicating over various networks, one skilled in the art can envision them as being implemented locally in one single entity.

As mentioned earlier, the Push download at the iPPG is carried out via protocols such as HTTP. It should, however, be noted that the data receiver does not perform any protocol mapping as the ASP uses standard API, which the end device is equipped with, or optionally, the end device equipment is pre-downloaded with non-standard API by using an original equipment manufacturer (OEM) provided serial interface and drivers. Furthermore, the ASP provides a selection of various fields (services and control categories) as provided by the iPPG. Additionally, if a mandatory element is not initialized, the iPPG performs default initialization.

Figure 4 illustrates how incoming data is handled at the client (receiver's end - an IBOC-enabled mobile device **400**). An antenna **401** located on the receiver first receives incoming data, and detection equipment **402** detects such data and optionally amplifies the signal. The received data is then deinterleaved via deinterleaver **405**, demodulated via demodulator **406**, decoded via a

decoder **407,** and further decoded via a turbo broadcast layer decoder **408**. Audio signals are converted into audible sounds and are forwarded to the speaker **403**. Additionally, the detection equipment **402** uses a channel quality measurer **404** to calculate the quality associated with tuned channel. It should be noted that the processing unit **409** actively controls the above-described deinterleaver, demodulator, decoder, and turbo broadcast layer decoder. Lastly, the processing unit and memory **410** process the decoded data before being presented to the end user device, via a display device **412** (with input **411**). The input/output (I/O) **411** is used with MMI for storing private keys used to decode the broadcast data (including filtration initialization), wherein such keys are stored in ROM/RAM **410**.

A GPS system **413** is also included for receiving coordinate-related information. Additionally, the receiver also has a battery save module **414** that, when activated, saves battery energy by deactivating the receiver when scheduled transmissions not of interest are taking place. A wakeup function **415** is provided for activating the receiver when scheduled transmissions of interest are taking place to the receiver. In addition, an uplink module **416** is also provided for uploading profile related information to the iPPG via an existing wireless network.

Figure 5 illustrates in greater detail the interaction between the turbo broadcast (**506**), the ASP **503**, and the iBOC physical layer **504**. A man machine management module **502** interacts with ASP **503** to extract data transmitted by the iPPG. This data is presented upon demand (cached) in real-time to the listener's MMI **502**. The listener can select what services are being offered by radio station, and indicate if the listener is interested in receiving those services. The items of interest are communicated to TBL **506** to extract data when scheduled by iPPG. The

extracted data is then rendered in the end device (e.g., consumer electronics receiver such as a car radio receiver) via a dispatcher **510** that routes the data in a specific format to MMI **502**.

Thus, the TBL uses an iMAC parser **516** to parse the received data for control, content and validity, and as a next step, data protocol data units **518** are extracted. Then, a message **520** parser extracts the data PDU's from active and passive queues and with the help of a PDU reassemble means **522**. Software application layer **503** interacts with MMI **502** and dispatcher **510** to route the data to the corresponding end user agent. Thus, when a digital receiver (such as iBiquity's iDR™) receives Pushed content, a dispatcher looks at the Pushed message header to determine its destination application. The dispatcher is responsible for rejecting content that does not have a suitable destination application installed and accepting contents that are initialized by the subscriber.

Figure 6 illustrates a more specific instance of a high end receiver system, wherein the application software layer of Figure 5 is a vendor interface **602**. The vendor interface **602** interacts with a MMI stack **604**, which is interfaced with keypad **616**, audio **610** and display **608** to provide various services and management solutions. The external interface **606** includes interfacing with SIM **612**, an uplink **614** for communicating with the iPPG or the content provider center, and a GPS mechanism **618** for filtration of content with respect to latitude/longitude coordinate information. As described earlier, the services and management improvements include: power management **620**, channel quality management **622**, short message services **624**, zone broadcast **626**, and supplementary services **628** (to be described below).

Figure 7 illustrates the present invention's passive mode point-of-sale (POS) and bulk purchase of data content. Also illustrated is a general time-line diagram showing some of the elements involved in the present invention's system for electronic bulk buying of data content. In this setup, one or more broadcast servers (hereafter B-servers) **702** transmit information to one or more receivers **704** over a network such as an in-band on-channel (IBOC) network. In the preferred embodiment, the broadcast information comprises origination and terminator address (E.164 or URL) advertisement content and may carry administration and maintenance (OAM) instructions.

Next, the receiver **704** receives the broadcast data, processes the received data, and renders the data via a man-machine-interface (MMI) **706**. For example, in case of an MMI **706** equipped with a graphical user interface (GUI), the processed broadcast data content is displayed in the GUI along with any advertisement content that was received. Optionally, any originator and terminator addresses are either stored or displayed. Then, based upon the rendered information, the user of receiver **704** performs an action **710** such as pressing a touch-screen button indicating a purchase, which in turn is interpreted by the MMI **706** and the receiver **704**, which uses a terminator address and triggers uplink module for a circuit or packet link. If the action **710** involves charging the end user, an authorization step is initiated wherein the end user authorizes **712** a payment for any requested merchandise.

In the above example, the actions taken **710** include, but are not restricted to, storing displayed data content, clearing displayed data content, buying one or more products based upon the displayed advertisements, or browsing other data content and advertisements. It should be

noted that although specific examples of actions are given, one skilled in the art of electronic commerce can envision other possibilities, and thus should not use such actions to limit the scope of the present invention.

Such actions performed at the digital audio broadcast receiver's end are tracked and once a predetermined amount, or threshold amount, of actions are accumulated, an order **711** is placed with regard to all the accumulated actions. Thus, in the preferred embodiment, users with a digital audio broadcast receiver are able to request multimedia audio content from content providers, and the requests are tracked until a certain threshold level (e.g., 15 songs) is met. Once this threshold (e.g., 15 songs) is reached, an order is placed through a direct order placement service. Continuing with the example of 15 songs, the 15 songs are then bulk downloaded to the client at the scheduled time or are delivered, e.g., on a compilation CD to a physical address of the end user. Another reason for bulk buying is to accommodate uplink network efficiency. For example, a popular song may cause a lot of hits. If subscribers are most likely to place an order, the uplink access network will not have enough uplink channels to complete the call. Therefore, thresholding helps to spread out uplink access.

It should, however, be noted that although a specific example of digital audio content is used to illustrate the preferred embodiment, one skilled in the art of broadcasting can envision other data content that can be broadcast, including other merchandise which is available for purchase without departing from the scope of the present invention.

Figure 8 illustrates a specific embodiment of the present invention's bulk buying procedure shown in Figure 7. In this specific embodiment, a direct order is placed from a

receiver to a direct order service (DOP) without an intermediate entity. This specific embodiment, as shown in Figure 8, illustrates the present invention's active mode real-time direct order placement using a protocol such as the point-to-point protocol. In this setup, one or more B-servers **802** transmit data content **812** to one or more receivers **804** over a network such as the IBOC network. The transmitted data content primarily comprises advertisement content, with turbo broadcast header and operation administration and maintenance instructions. Next, the receiver **804** parses the broadcast data **812** for terminating address (E.164 or URL) and contents, and renders the data content via a man-machine interface (MMI) **806**. Thus, in the instance the MMI **806** is equipped with a GUI, the broadcast data content is rendered (displayed) in the GUI. Then, the receiver's owner is able to view the broadcast content, and based upon the displayed content, one or more actions **814** performed by the user are tracked. In the instance the performed action is a "buy" **815**, and if as mentioned earlier the total number of actions (or "buy" actions in this case) is equal to or greater than a predetermined threshold, the MMI **806** connects to a direct order placement (DOP) service **810** via a network such as the circuit or packet network and places an order. The interaction between the receiver **804** and the DOP **810** is described below in greater detail.

First, the MMI **806** establishes a connection to the DOP service **810** via a communication interface of any access network **808**. Next, the MMI **806** provides the terminating address (URL or E.164) to "ATDT", and sends an "ATDT" command **816** to device uplink access interface (e.g., a modem) **808**. As the next step, the access network **808** communicates with the DOP **810**, via a set of well-known instructions **818**, to establish a PPP connection.

In this embodiment, after a PPP connection is established (via instructions **818**) between the access **808** and the DOP **810**, the receiver **804** and the DOP **810** exchange system information **820** for synchronization and authentication purposes. The exchanged system information **820** includes global positioning system (GPS) time stamp information and station FCC identifier and random numbers, wherein the B-server **802** and the DOP **810** are synchronized so that the DOP **810** knows via which broadcaster an order was placed.

Next, once system information is successfully exchanged, an order is placed with the identified broadcaster, or optionally, an order with an entity as indicated by the identified broadcaster. After that, the receiver **804** displays information regarding the status of the order **822** via the MMI **806**. If the action **814** involves charging the end user, an authorization step is initiated wherein the end user authorizes **823** a payment for any requested merchandise. Upon final confirmation from the user regarding end of transactions, an exit signal **824** is sent from the receiver **804** to the MMI **806**, which in turn issues an "on-hook" command **826** to disconnect the access network **808** from the DOP **810**.

During this time display status **822** information is being sent to MMI to help the listener what actions are being carried on. Once transaction is completed **823**, an exit **824** is generated by the receiver **824** which instructs MMI **806** to go on-hook, and a graceful disconnect **828** is issued. The DOP **810** now has complete information about content, and listener data and can complete the transaction. As no standard defines the content's unique identification, e.g., same song can get different identifier when played from same station or different stations. Therefore

content is time tagged with a GPS time stamp and a random number (further explained in Figure 9).

Figure 9 illustrates the relation between a GPS time stamp and broadcast data content. As mentioned earlier, each broadcast by the iPPG contains data content and advertisement content. Furthermore, when the receiver (as described in Figure 4) receives the broadcast data content, a GPS time stamp is determined in relation to the received content. For example, when the receiver (in Figure 4) receives a first set of broadcast content **902**, a GPS time stamp (GPS Time Stamp 1 **904**) is determined for this specific set of broadcast content. Similarly, GPS time stamps (**910** and **912**) associated with other broadcast content (**906** and **908**) are also marked.

Referring back to Figure 8, when the client inputs an "action", such as "buy", via receiver **804** and MMI **806**, based upon the broadcast information, the GPS time stamp associated with that specific broadcast is recorded. The time stamps are a part of the system information that is exchanged between the receiver **804** and the DOP **810**. These time stamps help the DOP **810** in identifying the specific advertisement merchandise or the specific data content (that was rendered in the receiver) that caused the user to record a "buy" action. This allows the DOP to know which broadcaster caused which "buy" action. Additionally, the step of exchanging system information also includes an additional step of comparing a random number for unique identification of content. Unique identification can also be achieved by DOP by combining GPS time stamp and FCC allocated station ID, called "station call letter".

Figure 10 illustrates the present invention's active mode real-time indirect order placement using transmission control protocol/Internet protocol (TCP/IP). In this embodiment,

one or more receivers **1002** receive broadcast content from one or more broadcast servers **1008**. Unlike the embodiment in Figure 8, the embodiment in Figure 10 involves indirect order placement, wherein an order is placed from a receiver **1002** to a DOP **1004**, via an intermediate entity (a B-server **1006**).

In this embodiment, once broadcast content **1000** is received, a receiver **1002** renders the content via a MMI **1008** (e.g., via a GUI that is a part of the MMI **1008**). Next, the receiver **1002** displays action choices **1010** such as Query, Buy, Store, and Clear. Based upon the action "buy" **1011**, the MMI **1008** associated with the receiver **1002** connects to the B-server **1006** via a communication interface (e.g., a modem) or any uplink access network supported by the client device **1012**. As a next step, the uplink access network interface **1012** exchanges a set of commands **1013** and **1014**, and establishes a communication link, such as a TCP/IP link, with the B-server **1006**.

Next, the receiver **1002** and the B-server **1006** exchange system information **1016** for completing any transactions requested by the user of receiver **1002**. The information exchanged primarily **1016** comprises a random number comparison, wherein the B-server **1006** compares random numbers for authentication purposes. It should be noted that, unlike in the embodiment described in Figure 6, there is no need for exchanging any GPS time stamp information, since the B-server **1006** is already aware of the broadcast information to which the "action" was directed towards.

After the system information **1016** is successfully exchanged, the receiver **1002** displays information regarding the status of the order **1018** via the MMI **1008**. This status information

primarily indicates whether or not the B-server has been successfully intimated to place an order. If the action **1010** involves charging the end user, an authorization step is initiated wherein the end user authorizes **1019** a payment for any requested merchandise. Upon final confirmation from the B-server **1006** regarding the status information, an exit signal **1020** is sent from the receiver **1002** to the MMI **1008**, which in turn issues an "on-hook" command **1022** to disconnect the access network **1008** from the B-server **1006**.

Lastly, the B-server places the electronic order to the direct order placement service **1004**, which in turn makes sure the order is processed and the requested content or product is sent to the requestor.

Thresholding, done at the receiver, is vendor (OEM) specific. The listener is asked for thresholding via the MMI, and thresholding is dependent on client device's class. More memory means you can store more content. When the thresholding field is initialized and when this limit is received, the receiver instructs uplink access module **514** or I/O **504** of Fig. 5 to initiate active or passive Buy/Query interaction.

Figure 11 illustrates the active mode real-time indirect order placement embodiment of the present invention, wherein communication between a receiver and the B-server is accomplished via wireless datagram protocol (WDP) (the same can be done via a file transfer protocol (FTP) such as iBiquity's proprietary iFTP™). In this embodiment, the broadcast information is sent from the B-server **1102** to the receiver **1104**. Next, the broadcast content is processed and rendered via a MMI **1106**. In the instance the MMI **1106** comprises a graphical user interface (GUI), the broadcast content is visually rendered (displayed) in the GUI.

Then, the user of receiver **1104** performs an "action" **1110** ("buy"), which alerts the MMI **1106** to establish a communication link between the receiver **1104** and the B-server **1102**. The MMl **1106** is equipped with a communication interface (any uplink access network **1112**), which is capable of communicating with a network call center (N/W-X **1114**) associated with the B-server **1102**. Thus, after the receiver uplink access and B-server (or call center) interfaces exchange a set of instructions **1116**, a virtual wireless data protocol (WDP) link is established **1118** between the B-server **1102** and the receiver **1104**.

B-server (or call center) performs the exchange of system information, wherein such information include, but is not limited to, IBOC parameters, uplink access parameters, electronic serial numbers (ESNs), random numbers, authentication data, etc. During this process, the receiver **1104** displays the status information regarding actions between call center and B-server. The B-server through its uplink instructs receiver the time of day when it intends to broadcast. In this way a virtual wireless data protocol (WDP) link is established **118** between B-server **1102** and the receiver **1104**.

Furthermore, in another embodiment, the thresholding that is done at the receiver or the iPPG is based upon time, instead of the number of songs. For example, the receiver can have a preset threshold of one hour, wherein if the requested content has reached this limit (of one hour's worth of requested content or 8 hours have since a request for buy has been made), an order is placed (or processed) for the delivery of the content to the receiver. Thus, the thresholding is done based on either the amount of requested data content (for example, a threshold of 15 songs) or the time associated with the transmission of requested content (for

example, an hours worth of music to be downloaded). The default thresholding associated with the receiver is stored on a memory chip. This method of bulk downloads is iPPG directed, where, iPPG collects information from various receivers. For certain items of interest, it informs receivers the schedule when it will broadcast such items. Thus, instead of the call center, the B-server does everything, and all downloads are done directly over the iBOC to receivers.

In an extended embodiment, the threshold associated with the receiver is changed via a network such as the Internet. Thus, the threshold is modifiable by the users of the receiver, the broadcasters, or the content providers themselves. The content providers are also able to have package thresholds, wherein actions are recorded after delivering a series of songs and commercials to the receiver. Next, based upon the action input at the receiver's end, the DOP is notified of any orders that need to be placed. Thus, in this instance, the content providers decide how many songs and advertisement comprise the package to be transmitted.

The present invention includes a computer program code based product, which is a storage medium having program code stored therein, which can be used to instruct a computer to perform any of the methods associated with the present invention. For example, the computer program code based products incorporate software modules for receiving broadcast information comprising advertisement content and data content; processing the received data; rendering processed content to a user; recording inputs related to rendered content from a user; establishing a communication link for exchanging system information comprising random numbers and GPS time stamp information; rendering status information regarding recorded inputs; and placing an electronic business order based upon recorded inputs and any user actions regarding the status

information. The computer storage medium includes any of, but not limited to, the following: CD-ROM, DVD, magnetic tape, optical disc, hard drive, floppy disk, ferroelectric memory, flash memory, ferromagnetic memory, optical storage, charge coupled devices, magnetic or optical cards, smart cards, EEPROM, EPROM, RAM, ROM, DRAM, SRAM, SDRAM or any other appropriate static or dynamic memory, or data storage devices.

Additionally, as well known in the art, the above-described programming may be implemented in various computing environments. For example, the present invention may be implemented across a multi-nodal system (e.g., LAN) or networking system (e.g., Internet, WWW, wireless web). The programming of the present invention may be implemented by one of skill in the art of network communications, mark-up language and protocol programming.

It should be noted that although the above embodiments describe an authorization step in the time-line, one skilled in the art of electronic commerce can envision other possibilities and other specific locations in the time line for performing such authorizations. Thus, the specific location of the authorization step in the time line diagrams in each of the above-described embodiments should not be used to limit the scope of the present invention. While various preferred embodiments have been shown and described, it will be understood that there is no intent to limit the invention by such disclosure, but rather, it is intended to cover all modifications and alternate constructions falling within the spirit and scope of the invention, as defined in the appended claims. For example, the present invention should not be limited by software/program, computing environment, specific computing hardware, choice of communication protocols, location of the broadcast server, location of the direct order placement